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REMARKS

DETAILED ACTION

Claim Rejections - 35 USC §112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. The Examiner has rejected Claims 1-5 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

2a. It is not clear as to whether "a printed circuit board" (claim 1, line 4) as same as one that previously recited in line 2 of claim 1.

2. Applicant has amended Claim 1 to more clearly and concisely define the present invention by amended claim 1 to read as follows:

"A method for maintaining reliability of a **Printed Circuit Board support apparatus**, the method comprising the steps:

*utilizing elongated support members to support a **Printed Circuit Board** during a solder paste application process used to apply solder paste onto **said Printed Circuit Board**,*

*wherein **said elongated support members** are positioned in an array layout to support **said Printed Circuit Board**, wherein each of the elongated support members are configured and held within apertures of a base member,*

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profiling said elongated support members by adjusting a vertical position of said elongated support members within said apertures in a manner to match a profile of said Printed Circuit Board, and

deflecting said solder paste from impinging upon an interface between said elongated support member and said aperture of said base member using a protective collar."

Claim 1 as amended more clearly defines the present invention as a Printed Circuit Board support apparatus in Line 1 of Claim 1 and then introduces the element of a Printed Circuit Board in line 2 of Claim 1. Applicants believe the rejection of Claims 1-5 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention as to whether "a printed circuit board" (claim 1, line 4) as same as one that previously recited in line 2 of claim 1 has been overcome by amendment to Independent Claim 1. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claims 1-5 under 35 U.S.C. 112, second paragraph.

2b. The Examiner has rejected Claims 1-5 as the scope of the claim is not clear because it recites an outside element such as solder paste and the defecting of the solder paste ... with a protective collar" is not clear as to how the "solder paste" and "defecting (*respectfully interpreted as deflecting*) step" have any thing to do with the method for maintaining of a support as recited in the preamble of the claims 1-5. It appears that the "use of a protective collar" for defecting of solder paste from impinging upon the interface region.

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Applicants have amended the preamble of Claim 1 to more clearly and concisely define the present invention to read as follows:

"A method for maintaining reliability of a Printed Circuit Board support apparatus, the method comprising the steps:

utilizing elongated support members to support a Printed Circuit Board during a solder paste application process used to apply solder paste onto said Printed Circuit Board,

wherein said elongated support members are positioned in an array layout to support said Printed Circuit Board, wherein each of the elongated support members are configured and held within apertures of a base member,

profiling said elongated support members by adjusting a vertical position of said elongated support members within said apertures in a manner to match a profile of said Printed Circuit Board, and

deflecting said solder paste from impinging upon an interface between said elongated support member and said aperture of said base member using a protective collar."

Applicants have amended the preamble to more clearly define the present invention as a means for maintaining reliability to a Printed Circuit Board Support Apparatus by deflecting solder paste to avoid binding at the interface between the elongated support member and the aperture. This avoids the build up of solder paste at the interface where the parts move. Solder paste build up at the interface would hinder the vertical movement of the elongated support member. Applicants believe all elements introduced to the claim are properly supported by the specification and drawings; therefore no new matter has been introduced.

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Applicants believe the claim has been amended to properly incorporate all elements introduced into the claim by amendment.

Claim 1 as amended more clearly defines the present invention as a method for maintaining reliability of a Printed Circuit Board support apparatus. Applicants believe the rejection of Claims 1-5 under 35 U.S.C. 112, second paragraph, as *"the scope of the claim is not clear because it recites an outside element such as solder paste and the defecting of the solder paste ... with a protective collar" is not clear as to how the "solder paste" and "defecting (respectfully interpreted as deflecting) step" have any thing to do with the method for maintaining of a support as recited in the preamble of the claims 1-5. It appears that the "use of a protective collar" for defecting of solder paste from impinging upon the interface region" has been overcome by amendment to Independent Claim 1. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claims 1-5 under 35 U.S.C. 112, second paragraph.*

2c. The Examiner has rejected Claims 3-4 stating it is not know how the collar being use to protect the circuit board and its compliant area as recited in claim 3, further, limitation of claim 4 is not under stood because it in unclear as to how a portion of the collar can protect a PCB.

Applicants have amended Claim 3 to read as follows:

"The method of Claim 1 further comprising the step of protecting said Printed Circuit Board by utilizing a compliant material positioned on said elongated

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support members proximate a location where said elongated support members contact said Printed Circuit Board."

Applicants have amended Claim 3 to more clearly and concisely define the present invention by better defining how the collar being use to protect the circuit board and the location of the compliant area. Applicants believe the rejection of Claim 3 under 35 U.S.C. 112, second paragraph, as *"It is not know how the collar being use to protect the circuit board and its compliant area as recited in claim 3"* has been overcome by amendment to dependent Claim 3. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claim 3 under 35 U.S.C. 112, second paragraph.

Applicants have amended Claim 4 to read as follows:

"The method of Claim 1 further comprising the step of protecting said Printed Circuit Board by using said protective collar fabricated of a compliant material, and designing said protective collar to additionally comprise an area which covers a point of contact between said elongated support members and said Printed Circuit Board."

Applicants have amended Claim 4 to more clearly and concisely define the present invention by better defining how the protective collar protects the Printed Circuit Board by including a compliant area where the elongated support members and the Printed Circuit Board contact each other. Applicants believe the rejection of Claim 4 under 35 U.S.C. 112, second paragraph, as *"limitation of claim 4 is not under stood*

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because it is unclear as to how a portion of the collar can protect a PCB" has been overcome by amendment to dependent Claim 4. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claim 4 under 35 U.S.C. 112, second paragraph.

2d. The Examiner has rejected Claim 5 stating the scope of claim 5 is not clear because it directs to a method (fabrication) instead of the method recited in claim 1.

Applicants have amended Claim 5 to read as follows:

"The method of Claim 1 wherein said step of deflecting said solder paste from said interface between said elongated support member and said aperture of said base member using a protective collar, **wherein said protective collar is fabricated as a feature of said elongated support member.**"

Applicants have amended Claim 5 to more clearly and concisely define the present invention by better defining that the step of deflecting the solder paste is via using a protective collar that is fabricated as a feature of said elongated support member. Applicants believe the rejection of Claim 5 under 35 U.S.C. 112, second paragraph, as *"the scope of claim 5 is not clear because it directs to a method (fabrication) instead of the method recited in claim 1"* has been overcome by amendment to dependent Claim 5. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claim 5 under 35 U.S.C. 112, second paragraph.

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Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The Examiner has rejected Claims 1-5 as best understood under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159).

4a. Collins discloses a method for maintaining reliability of a support to a printed circuit board comprising steps of positioning elongated support members in an array layout to support a printed circuit board, wherein the elongated support members are configured and held within a base member (see Figs. 2-5). Collins does not teach step of deflecting solder paste from interface between the elongated support member and the base member with a protective collar. However, Collins does teach the use of a protective collar such as 54 or 58 as shown in Fig. 5 and the discussion at col. 11, about lines 25-45 for processing of PCB. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the teaching of a protecting collar as taught by Collins for various known benefits including that as described above such as for controlling the pin movement including the deflecting of and displacement, etc. (see col. 3, lines 25-45).

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Claim 1, as amended comprises the limitation of *"utilizing elongated support members to support a Printed Circuit Board during a solder paste application process used to apply solder paste onto said Printed Circuit Board...deflecting said solder paste from impinging upon an interface between said elongated support member and said aperture of said base member using a protective collar."*

Collins teaches an apparatus for testing a printed circuit board, not for deflecting solder paste away from impinging upon an interface between an elongated support member and an aperture. Collins teaches a bed of nails testing and there would be no motivation for applying any of the teachings from Collins as applied to a process for applying solder paste. Collins further fails to teach an elongated support member for supporting a Printed Circuit Board. Collins provides a collar (58) near the contact (upper) end of each pin, wherein said collar can pass therethrough provided the locking plate is fully in register. (Col 11, Lines 28-33). Therefore the collar of Collins would allow foreign material to enter an aperture allowing the pin to potentially get jammed by the foreign material. Collar (54) is not positioned wherein said collar can deflect any material away from the interface and therefore would not provide any motivation for the application of Collar (54) for the present invention as claimed.

Applicants have amended Claim 1 to more clearly and concisely define the present invention by better defining that the step of deflecting the solder paste is via using a protective collar. Applicants believe the rejection of Claims 1-5 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) has been overcome by remarks herein and amendment to Independent Claim 1. Applicants earnestly

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request the Examiner reconsider and withdraw the rejection of Claim 1 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159).

4b. As applied to claim 2, regarding the collar to be a molded rubber, it would have been an obvious matter of design choice to choose any material structural from a group of host materials since applicant has not disclosed that the claimed protective collar is a molded rubber such material would solve any stated problem or is for any particular purpose and it appears that the invention would perform equally well with the type and material of the protective collar 54 or 58 as taught by the prior art reference to Collins (see Fig. 5).

Claim 2 depends from Independent Claim 1. Applicants believe Claim 1 has overcome the rejection under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) and therefore Claim 2 should be allowable.

Applicants have amended Claim 1 to more clearly and concisely define the present invention. Applicants believe the rejection of Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) has been overcome by remarks herein and amendment to Independent Claim 1. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159).

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4c. As applied to claims 3-4, since Collins discloses the collar being position on the pins array as depicted in Fig. 5, he inherently discloses the limitation of claims 3-4 where the collar for protecting an associated compliant contact area of the PCB and that as recited in claim 4.

Claims 3-4 depend from Independent Claim 1. Applicants believe Claim 1 has overcome the rejection under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) and therefore Claims 3-4 should be allowable.

Additionally, Claims 3-4 present the use of a compliant material to protect the Printed Circuit Board at the point of contact. Collins cannot use a compliant material for protecting the Printed Circuit Board at the point of contact, as Collins teaches a test fixture. The test fixture is designed to have metal-to-metal contact between the conductive metal of the test pin contacting the conductive metal of the Printed Circuit Board.

Applicants have amended Claim 1 to more clearly and concisely define the present invention. Applicants believe the rejection of Claims 3-4 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) has been overcome by remarks herein and amendment to Independent Claim 1. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claims 3-4 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159).

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4d. As applied to claim 5, Collins discloses the protective collar and the support pin is being formed a single piece structure as shown in Fig. 5. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form a pin structure that have a collar formed there from, since it has been held that forming in one piece an article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

Claim 5 depends from Independent Claim 1. Applicants believe Claim 1 has overcome the rejection under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) and therefore Claim 5 should be allowable.

Applicants have amended Claim 1 to more clearly and concisely define the present invention. Applicants believe the rejection of Claim 5 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159) has been overcome by remarks herein and amendment to Independent Claim 1. Applicants earnestly request the Examiner reconsider and withdraw the rejection of Claim 5 under 35 U.S.C. 103(a) as being unpatentable over Collins (4,730,159).

Newly Added Claims

Applicants have added two Independent Claims, Claims 8 and 14.

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Claim 8 comprising the elements of an elongated support member apparatus, application of solder paste, and the protective collar are all supported in the specification and drawings. Claims 9-12 are similar to claims 2-5. Claim 13 introduces a mechanism to secure said elongated members which is supported by the specification and drawings. Applicant believes the amendments to overcome the rejections of Claims 1-5 were incorporated into Claims 8-12 and subsequent depending claims. Applicants believe that Claims 8-13 do not introduce any new matter. Applicants believe that Claims 8-12 overcome any rejections respective to Claims 1-5 in the subject office action. Applicants, therefore, earnestly believe that Claims 8-13 are in condition for allowance.

Claim 14 comprising the elements of an elongated support member apparatus, application of solder paste, a protective collar, and a solder paste application apparatus are all supported in the specification and drawings. Claims 17-20 are similar to claims 2-5. Claim 15 introduces a mechanism to secure said elongated members which is supported by the specification and drawings. Claim 16 depends from Claim 15 and comprises limitations similar to those of Claims 2-5. Applicant believes the amendments to overcome the rejections of Claims 1-5 were incorporated into Claims 14-20 and subsequent depending claims. Applicants believe that Claims 14-20 do not introduce any new matter. Applicants believe that Claims 14-20 overcome any rejections respective to Claims 1-5 in the subject office action. Applicants, therefore, earnestly believe that Claims 8-13 are in condition for allowance.

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CONCLUSIONS

The Examiner has established a shortened statutory period of three (3) months for response to the Office Action mailed on June 27th, 2005. Applicant has responded to the Office Action on or before September 27th, 2005 with a proper certificate of correspondence. Therefore, Applicant believes the response is considered timely and no additional fees are required. Applicant believes a complete response is submitted herein. Applicant believes the amendments have not introduced any new matter.

The present application, after entry of this amendment, comprises twenty (20) claims, including three (3) independent claims. Applicant has already submitted sufficient fees with the original application for twenty (20) claims, including three (3) independent claims. Applicant, therefore, believes that no additional fees respective to the pending claims are currently due.


Applicants believe that all remaining claims (1-20) are in condition for allowance. Applicants earnestly believe the amendments and remarks have overcome the objections and rejections of Claims 1-20. Applicants are co-inventors to the remaining claims herein.

If the Examiner believes that there are any informalities that can be corrected by Examiner's amendment, a telephone call to the Agent of Record (Allen Hertz) at (561) 883-0115 (Office)(Please leave a message) or (561) 716-3915 (cell phone) is respectfully solicited.

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Respectfully submitted,


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Please submit all correspondence concerning this patent application to:
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